● PRINTER RUSH ●
(PTO ASSISTANCE)

Application : 08/873,978 **Examiner :** Whisenant **GAU :** 1634

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[RUSH] **MESSAGE:** Specification: Page # 83 - Line # 10 - Equation-11 Paragraph - start line # 11 - Data is cut off at begining of item.

Thank you

[XRUSH] **RESPONSE:**

Missing data is

IAC

INITIALS:

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

REV 10/04

Equation 9

$$i_{AC} \cong (\text{electrons at } E_{DC} + E_{AC}) - (\text{electrons at } E_{DC} - E_{AC})$$

Equation 10 thus describes the AC current which should result:

Equation 10

$$i_{AC} = C_0 F\omega \tfrac{1}{2} ([0]_{E_{DC} + E_{AC}} - [0]_{E_{DC} - E_{AC}}) \quad (6)$$

As depicted in Equation 11, the total AC current will be the number of redox molecules C), times faraday's constant (F), times the AC frequency (ω), times 0.5 (to take into account the AC amplitude), times the ratios derived above in Equation 7. The AC voltage is approximated by the average, $E_{AC}2/\pi$.

Equation 11

$$i_{AC} = \frac{C_0 F\omega}{2} \left(\frac{\exp^{38.9 \left[E_{DC} + \frac{E_{AC}^2}{\pi} - E_0\right]}}{1 + \exp^{38.9 \left[E_{DC} + \frac{E_{AC}^2}{\pi} - E_0\right]}} \right) - \frac{\exp^{38.9 \left[E_{DC} + \frac{E_{AC}^2}{\pi} - E_0\right]}}{1 + \exp^{38.9 \left[E_{DC} + \frac{E_{AC}^2}{\pi} - E\right]}} \quad (7)$$

Using Equation 11, simulations were generated using increasing overpotential. Figure 22A shows one of these simulations, while Figure 22B depicts a simulation based on traditional theory. Figures 23A and 23B depicts actual experimental data using the Fc-wire of Example 7 plotted with the simulation, and shows that the model fits the experimental data very well. In some cases the current is smaller than predicted, however this has been shown to be caused by ferrocene degradation which may be remedied in a number of ways. However, Equation 11 does not incorporate the effect of electron transfer rate